REMARKS/ARGUMENTS

Claims 43-62 are pending in the application. Claims 43-62 have been cancelled and new claims 63-85 have been added. Reconsideration is respectfully requested in light of the foregoing amendments and the following remarks.

Interview

Applicants thank Examiner Bareford for extending the courtesy of a telephone interview with counsel on August 26, 2009, where proposed claim amendments, the cited references (WO 96/06200, Muehlberger and Zheng) and the Declaration of Dr. von Niessen were discussed. During the interview it was stated by Examiner Bareford that the Declaration of Dr. von Niessen overcomes the cited references. Examiner Bareford was also helpful in suggesting revisions to independent claim 63 so that it more clearly defines the invention. Applicants have revised claim 63 so that it more clearly sets forth that, inter alia, *using the plasma beam with a sufficiently high specific enthalpy and maintaining a process pressure between 50 and 2000 Pa, results in at least partially melting some of the powder and vaporizing at least 5% by weight of the powder, so as to form a vapor phase cloud.* The present response is filed as a follow up to the interview of August 26, 2009.

Specification

The substitute specification has not been entered because it did not conform to 37 CFR 1.125(b) and (c) because of the following:

(a) it allegedly contains new matter. Specifically, at paragraph [0006] the reference to "low density" transitional zones is allegedly new matter, in that it does not correspond to the previously described "low material" transition zones, which as previously noted by the Office Action, was confusing.

(b) The disclosure has been objected to because of certain informalities as set forth on Page 2 of the Office Action.

Regarding the objection to the term "lower-density or material-deficient" transitional zones in paragraph [0006] of the previously non-entered substitutes specification,

Applicants refer the Examiner to the original description at page 2, lines 14-16, where the zones are defined as such: "Transitional zones in which the density of the deposited material is lower than in the particles bound the particles at the side." Accordingly, in the original description on page 3, lines 26-27, the term "low-material transitional zone bound the particles from one another" should be understood as "low density transitional zone." Furthermore, Applicants submit that a proper translation of the related German text of the PCT application may be translated as "low density transitional zones delimit the particles from one another." Applicant is submitting herewith the declaration of Mr. Seka, who is proficient in both German and English to make a showing that "low-material transitional zone" should be understood as "low-density transitional zone."

Appropriate correction in the form of a new substitute specification, along with a Comparison Copy, is submitted herewith. The specification has been revised to conform it to the preferred format for U.S. patent applications as required in the Office Action.

Claim Objections

Claim 43 was objected to because of certain informalities. Applicants respectfully submit that the Office Action's objection with respect to claim 43 is now moot in view of the cancellation of this claim.

Double Patenting

Claims 43-62 were rejected on the ground of nonstatutory obviousness type double patenting as allegedly being obvious over claims 1-21 of U.S. Patent No. 7,482,035 in view of Muehlberger (U.S. Patent No. 5,853,815). First, Applicants respectfully submit that this double patenting rejection is now moot in view of the cancellation of claims 43-62.

Furthermore, Applicants acknowledge that a timely filed terminal disclaimer may be used to overcome the rejection. While Applicants respectfully submit that the claims of U.S. Patent No. 7,482,035 do not teach or suggest either alone or in combination with Muehlberger, each and every element of new claims 62-85, submitted herewith is a terminal disclaimer to disclaim the term of any patent issuing from the present application over the term of U.S. Patent No. 7,482,035.

Claim Rejections - 35 USC § 103

Claims 43-47 and 50-51 were rejected under 35 U.S.C. 103(a) as allegedly being unpatentable over WO 96/06200 (hereinafter '200).

Claims 43-47, 50-51 and 55 were rejected under 35 U.S.C. 103(a) as allegedly being unpatentable over Muehlberger (US 5,853,815) in view of '200.

Claims 48, 49, 52-54 and 56-62 were rejected under 35 U.S.C. 103(a) as allegedly being unpatentable over Muehlberger in view of '200 as applied to claims 43-47, 50-51 and 55 above, and further in view of Zheng (U.S. 5,817,372).

First, Applicants respectfully submit that the above claims rejections under section 103 are now moot in view of the cancellation of these claims. And, regardless of the above now moot rejections, Applicants respectfully submit new claims 62-85 are patentable over '200 or the hypothetical combination of the cited references since neither of these references either alone or in combination disclose or suggest every limitation of the new claims.

Filed herewith is a 37 CFR § 1.132 Declaration of Dr. Konstantin von Niessen, an expert in the field of plasma spraying and surface treatment. Dr. von Niessen has concluded that the art cited by in the Office Action did not render the invention obvious, for the following reasons. Further details of Dr. von Niessen's opinion are included in the declaration. Dr. von Niessen concludes:

In Dr. von Niessen's opinion, the '200 reference does not disclose or suggest the vaporization of at least 5 wt% of the powder coating material, even though the operating ranges in the '200 may overlap with those of the present invention. It is not and it was not obvious at the time of the filing of the present patent application to operate in the regime that causes at least 5 wt% of the powder coating material to be evaporated.

In Dr. von Niessen's opinion, a person of ordinary skill in the art at the time of the filing of the present patent application would have avoided any vaporization of the powdered coating material. And, the formation of the columnar structures that are made possible by being formed from the vaporized coating material was an unexpected result at the time of the filing of

this patent application. The Low Pressure Plasma Spray Process (LPPS) as described in '200 may be operated using parameter ranges disclosed in '200 so as to not vaporize the powder.

According to Dr. von Niessen's opinion, while the specific operational parameters and grain sizes of the powder of the present patent application may lie within the ranges disclosed in '200, the formation of the vapor phase is an exception for the parameter ranges disclosed in '200 and is not an inherent feature of such parameters to cause the formation of the vapor phase. Even if it may have been possible in '200 to get a small amount of vapor phase using the standard LPPS spray coating, in the standard deposition method the vapor phase fraction will get lost as overspray and the resulting coating will consist completely, i.e. 100%, of (frozen) liquid droplets.

It is Dr. von Niessen's opinion that, the aim of the standard LPPS spray coating method as described in the cited references is to avoid vaporizing the powder. Turning the standard method to one having a high amount of vaporized powder is not only not obvious, but is even illogical.

It is Dr. von Niessen's opinion that the formation of the vapor phase from the powder coating material allows for the columnar structure of the insulating layer that is formed from that vapor phase and which is formed by growing from the vapor phase, and only can be produced by growing from the vapor phase. Without the formation of the vapor phase nothing more than the dense homogenous layers which are formed from the frozen splashed droplets of liquid material would result.

Therefore, in Dr. von Niessen's opinion, at the time of filing the present patent application it was not obvious to operate in the regime that causes at least 5wt% of the powder to vaporize and form a vapor cloud. Moreover, one of skill in the art would have avoided vaporization because until the work of the inventors of the present application, the aim of using LPPS was the manufacture of dense homogenous layers using low pressure plasma spraying of liquid feed materials in the form of droplets resulting in layers of frozen splashed liquid material.

Accordingly, at the time of the filing of the present patent application, the possibility of using an LPPS-based method to form columnar structured layers that are formed from a vaporized powder cloud was an unexpected result.

According to Dr. von Niessen's opinion, the unexpected results of forming the columnar structured layers have many unexpected benefits over the typical homogenous layers that are formed by the prior known LPPS processes, such as those described in '200. These columnar microstructures have proven to have a high strain tolerance in furnace cycling tests and offer a low thermal conductivity. Real gas turbine substrates have been coated to demonstrate the ability of the process of the present invention for the deposition of such coatings onto components with complex shapes. Ongoing economical evaluations for columnar coatings on turbine components under production conditions show a clear saving potential when using the process of the present invention. This technology offers a high potential to support the development of new coating solutions for improved thermal barrier coating systems and their application under production relevant conditions with an increased economical benefit.

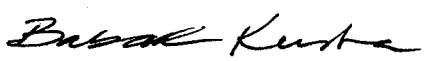
Therefore, Applicants respectfully submit that new claims 63-85 are patentable over the cited references or the hypothetical combination of the cited references since neither of these references either alone or in combination disclose or suggest each and every limitation of the new claims.

CONCLUSION

In view of the foregoing, Applicants believe all claims now pending in this Application are in condition for allowance. The issuance of a formal Notice of Allowance at an early date is respectfully requested.

If the Examiner believes a telephone conference would expedite prosecution of this application, please telephone the undersigned at 415-576-0200.

Respectfully submitted,



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